

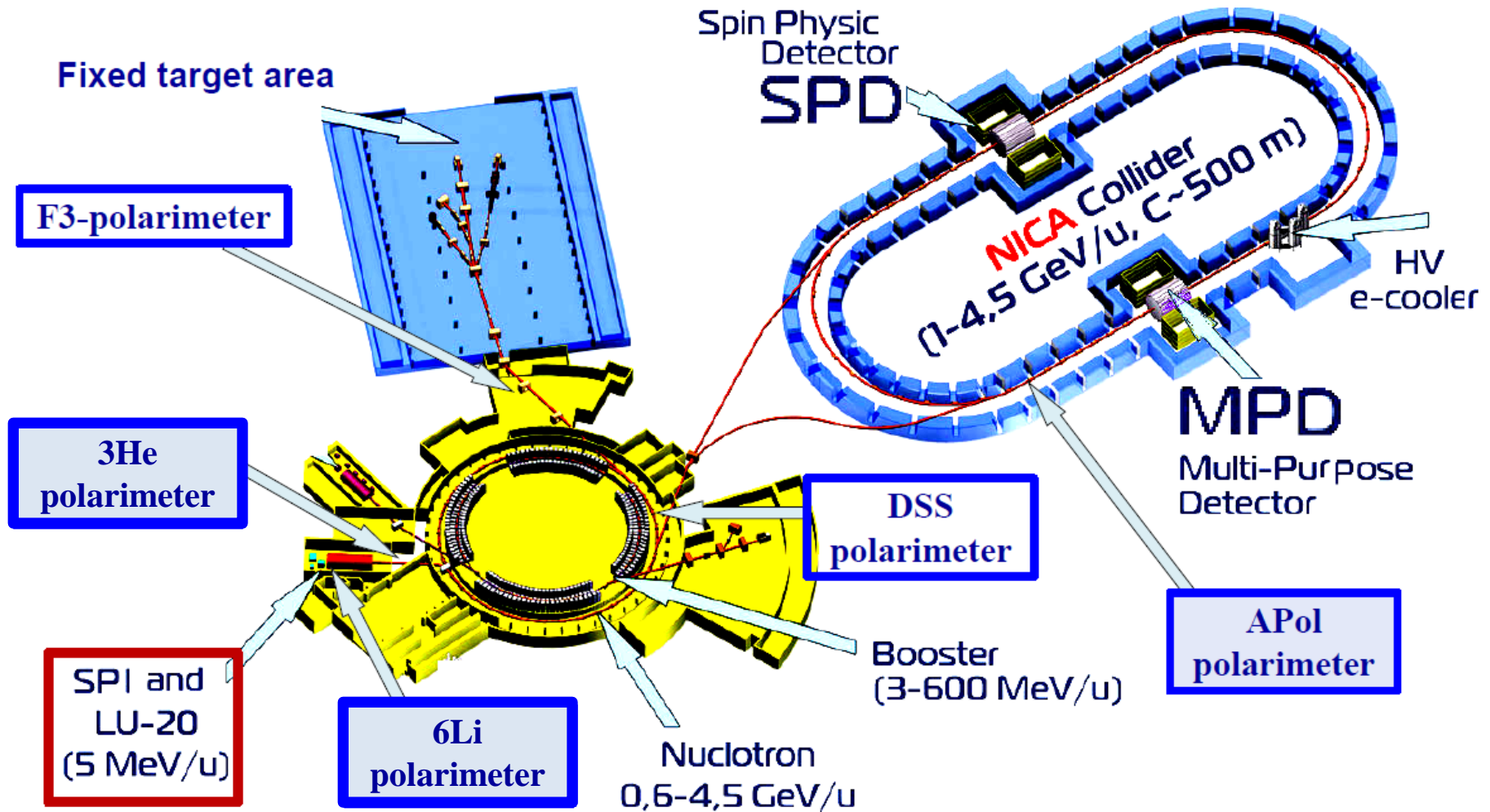


Low Energy ^3He Polarimeter

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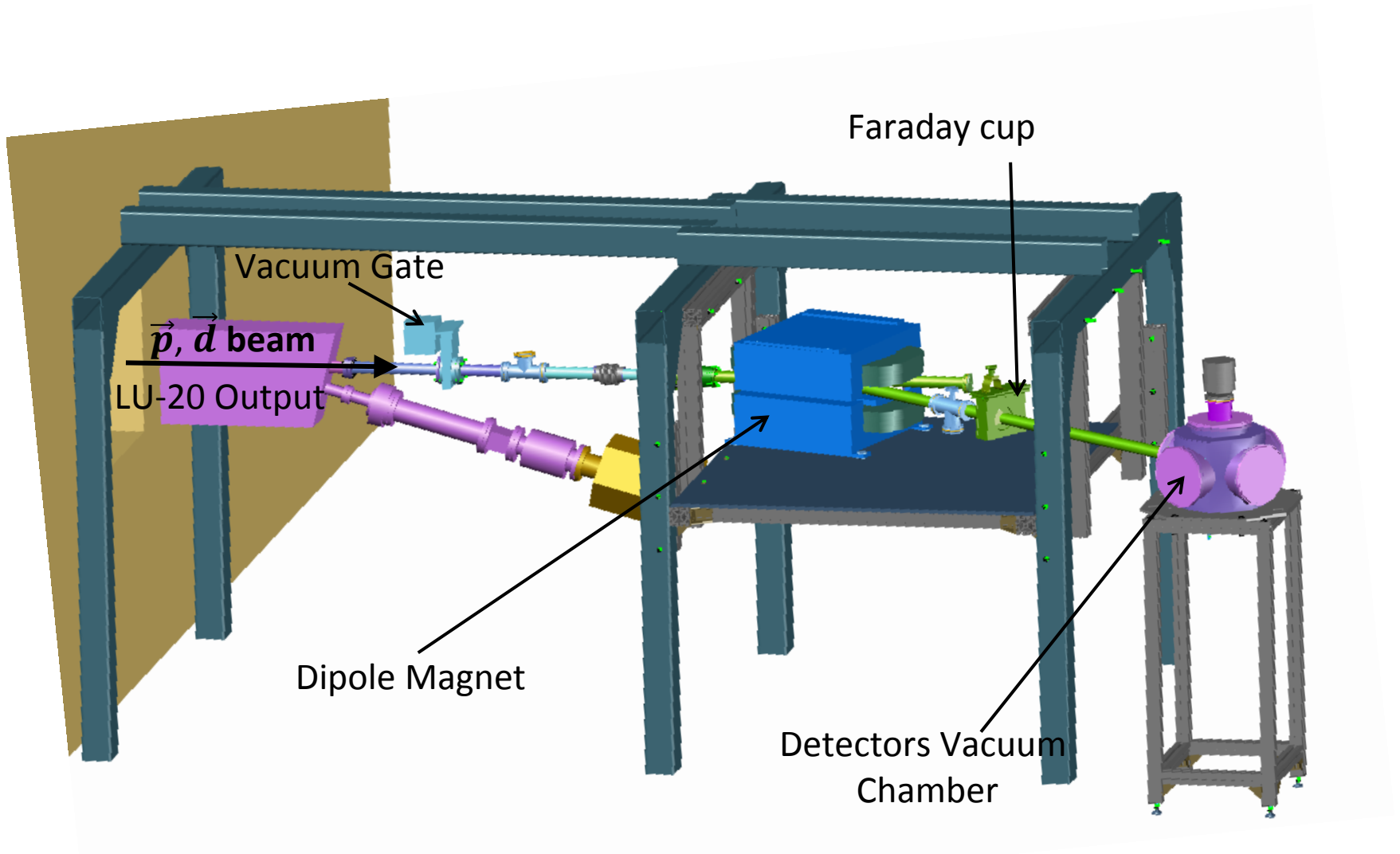
Joint Institute for Nuclear Research, Dubna

Implementation of polarization program



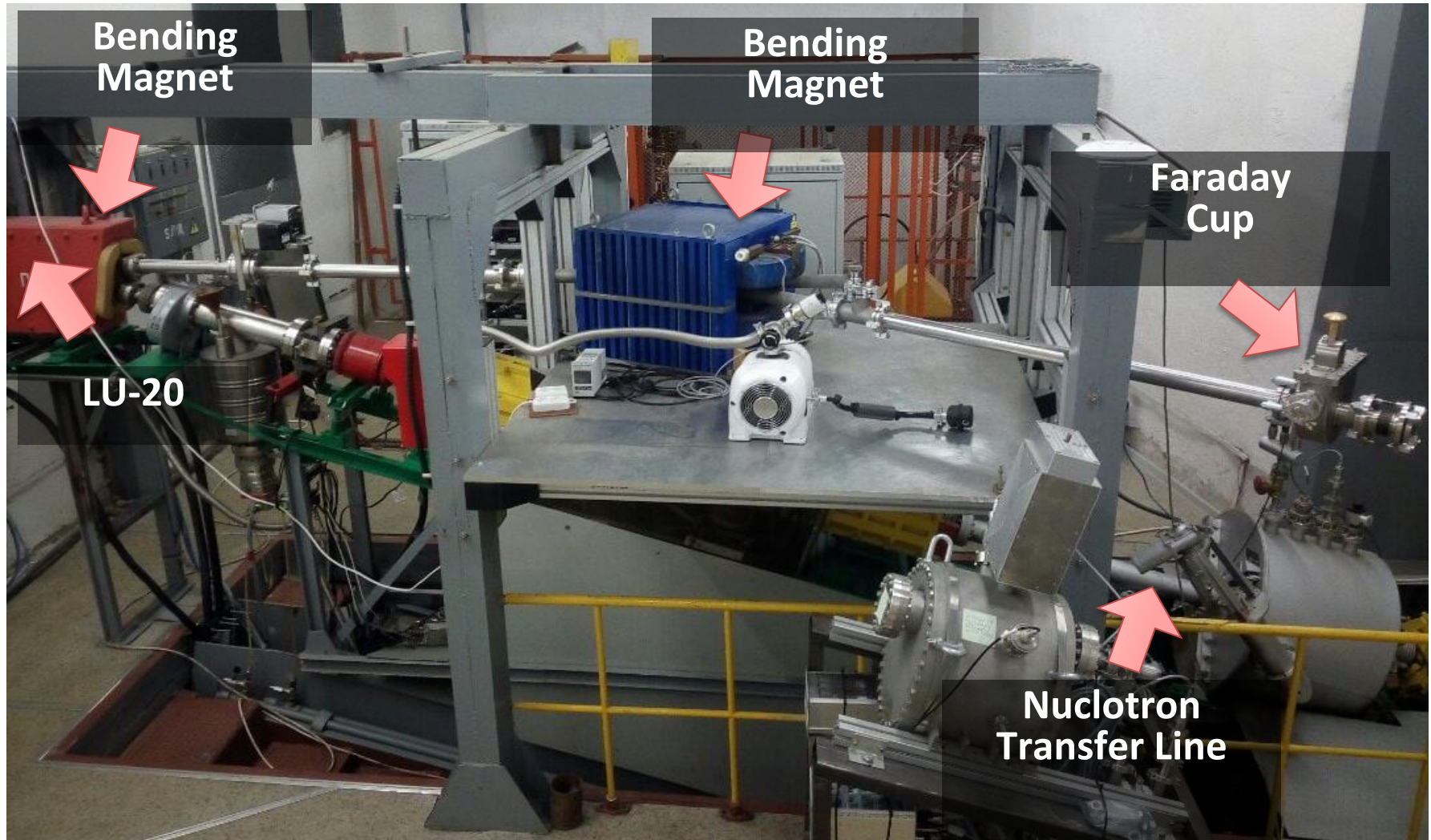
Physics with **polarized light ion beams** is considered as an important part of the **NICA** program

View of Low Energy 3He Polarimeter



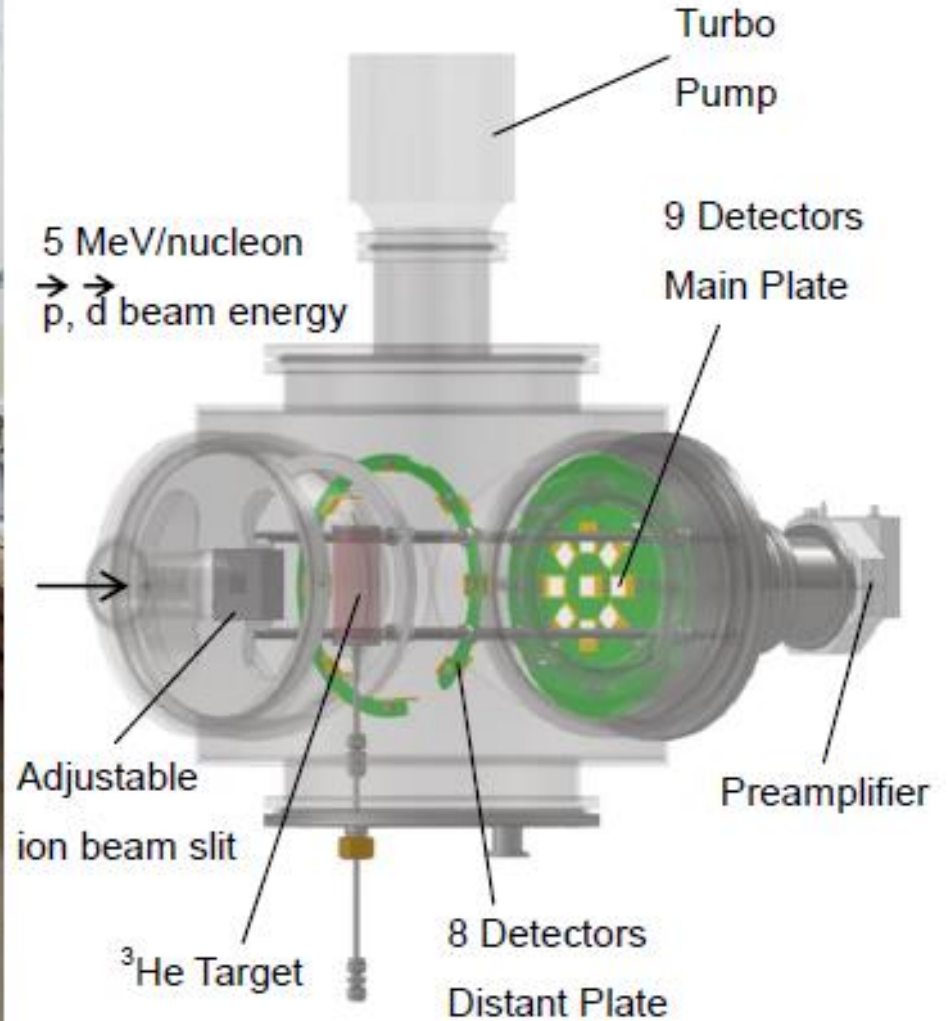
Low energy ^3He polarimeter is placed behind the linear accelerator Lu-20. Its operating energy is **5 MeV** per nucleon.

View of Low Energy 3He Polarimeter



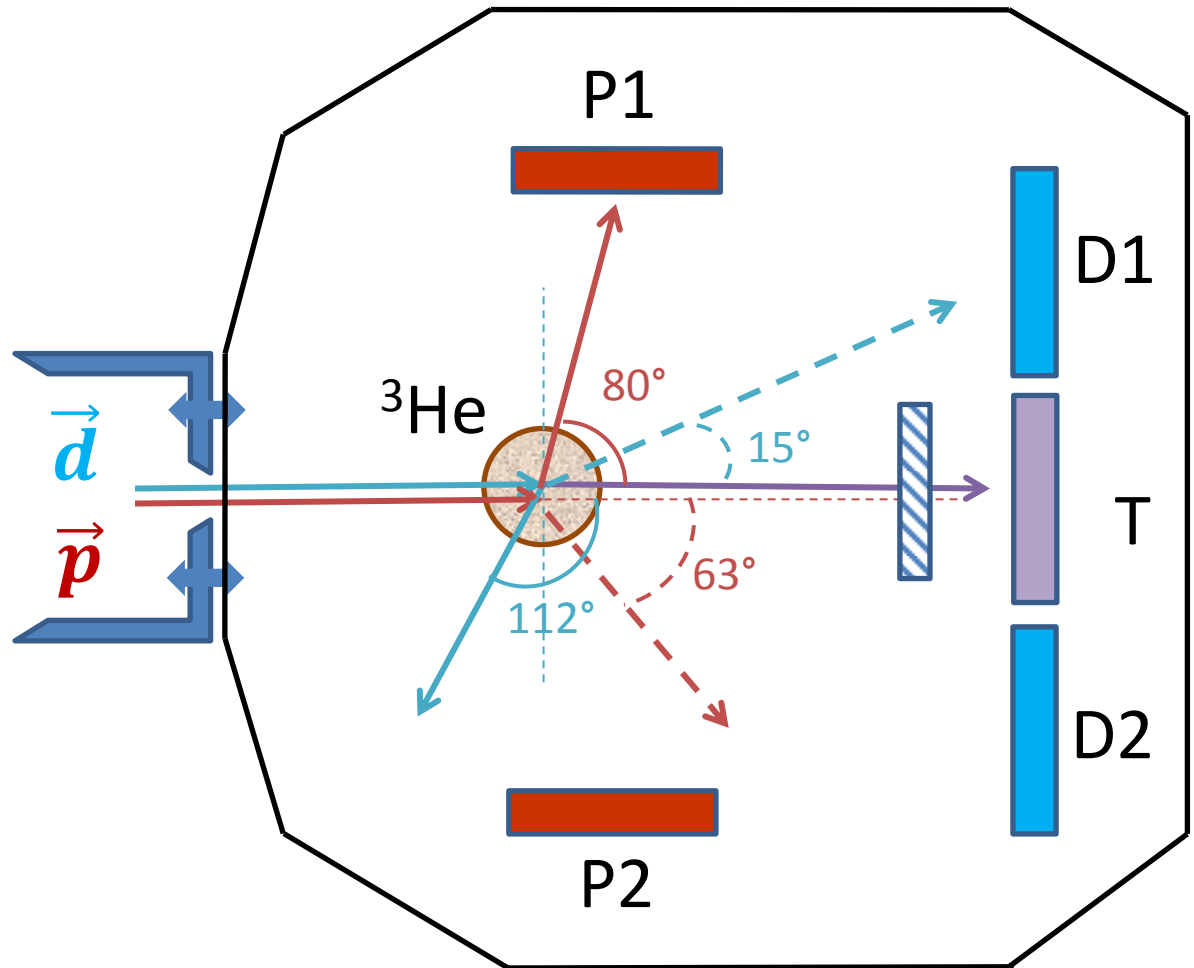
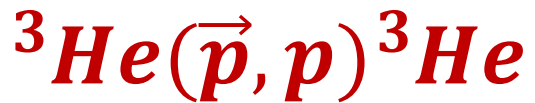
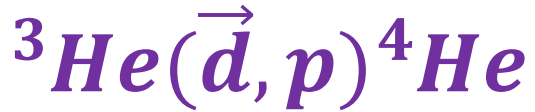
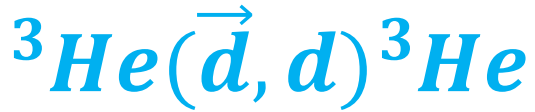
The main advantage of this polarimeter is that the setup may be used not only for polarization measuring but also for tuning SPI RF transition units (WFT, MFT, SFT).

View of Low Energy ^3He Polarimeter



It is assumed to use silicon detectors with the size of $20 \times 20 \text{ mm}^2$ and $300 \mu\text{m}$ thick.

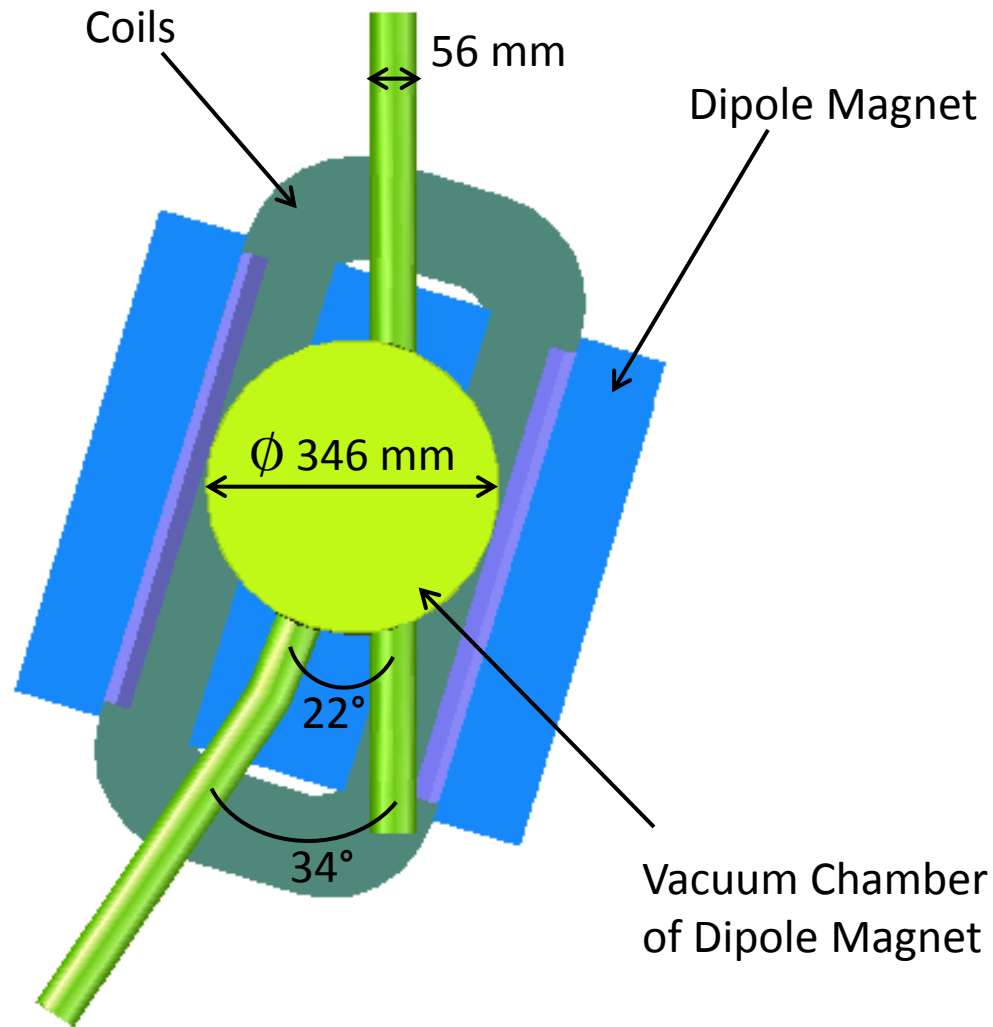
Scheme of Low Energy ^3He Polarimeter



- Recoil ^3He
- deuteron 10 MeV
- proton 5 MeV
- daughter proton 20 MeV

The ^3He target of this setup allows one to measure both the vector polarization of protons (with $^3\text{He}(p,p)^3\text{He}$ elastic scattering reaction) and the vector and tensor polarization of deuterons (with $^3\text{He}(d,d)^3\text{He}$ elastic scattering reaction and $^3\text{He}(d,p)^4\text{He}$ nuclear reaction).

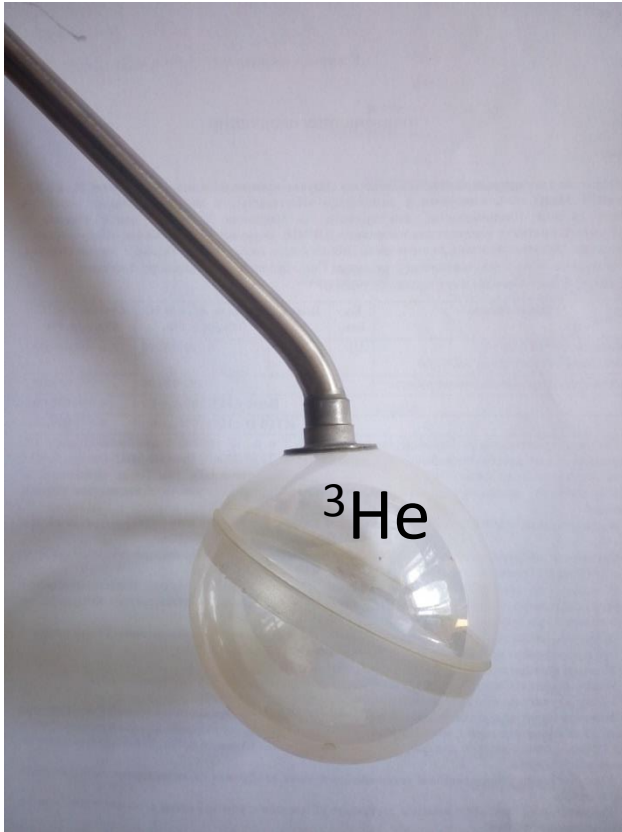
View of Polarimeter Dipole Magnet



The dipole magnet will be used to remove proton component from the deuteron beam.

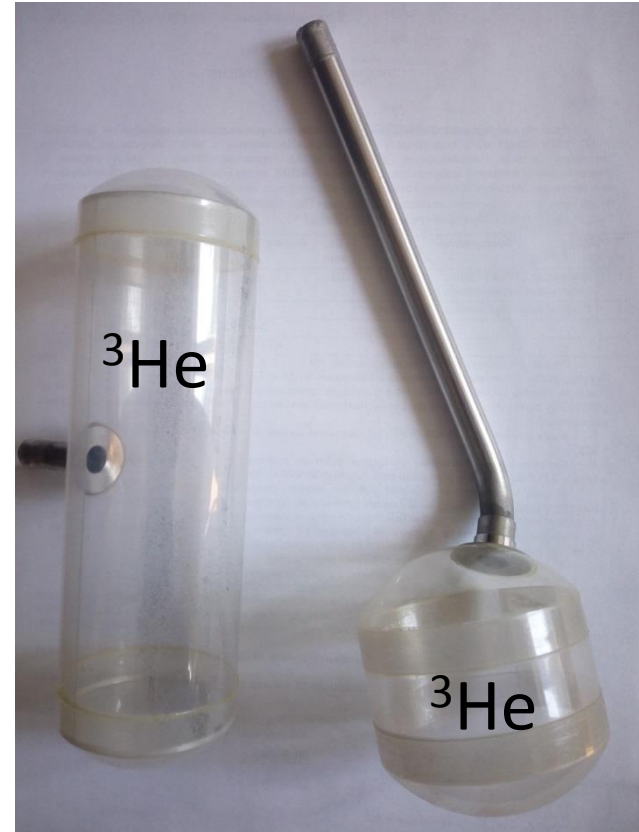
View of Polarimeter ^3He Target

Spherical mylar vessel



Radius – 50 mm

Cylindrical mylar vessel



Radius – 50 mm, Height – 70 mm

The gas absolute pressure is ~ 3 bar. The mylar wall is $170 \mu\text{m}$ thick.

The main features of the Low Energy ^3He Polarimeter

- Usage of up-to-date fast detectors. It is assumed to measure each bunch polarization.
- The data flow will be protected against electromagnetic noises.
- It is assumed that the design of the polarimeter will make it possible to measure vector and tensor polarization of deuterons with one setup simultaneously.
- The separation magnet will be used to remove the proton component from the deuteron beam.

Nearest plans

- Test the detector assembly of the polarimeter.
- Update and test DAQ system of the polarimeter.
- Test the polarimeter remote control system.



**Thanks for your
attention!**